COVID-19 Pandemic: Update, Successes, and Challenges

Physicians’ Research Network
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At the completion of this webinar, you will:

1. Be informed of the current epidemiological trends of COVID-19 in NYC, the US and the world

2. Understand the successful aspects of the response and how key milestones were reached

3. Be able to describe the remaining challenges to responding to COVID-19 in NYC and the US
Outline

• Global and local update
• Disparities in impact of COVID-19
• Responding to the COVID-19 epidemic
  • Challenges
  • Successes
• Spillover effects of COVID-19
• Summary
Outline

• Global and local update
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As of June 22nd:

• 8,999,645 confirmed cases globally
• 468,907 reported deaths*
• 4,462,698 reported recoveries

By Region:

• 49% in the Americas
• 29% in Europe
• 10% in the Eastern Mediterranean
• 7% in South-East Asia
• 3% in Africa
• 2% in the Western Pacific

Top five: US, Brazil, Russia, India, United Kingdom

Sources: John Hopkins, WHO
Evolution of COVID-19 Pandemic: January to June 2020

![Graph showing the evolution of COVID-19 pandemic from January to June 2020 with data sources: Evaluate: ECDC © Statista 2020]
COVID-19 in the US

Current Snapshot in US:
• 2,286,457 confirmed cases
  ▪ 25% of worldwide cases
• 119,997 reported deaths
  ▪ 26% of worldwide deaths

Sources: John Hopkins, New York Times
Emerging Trends in the US

Source: New York Times

[Map showing how the number of new cases has changed in the last two weeks, with colors indicating falling, about the same, rising, and few or no cases across the US states.]

Source: New York Times
US States with increasing number of cases:

- California: 1,911,098
- Texas: 1,244,720
- Florida: 1,003,490
- Georgia: 64,077
- Arizona: 58,397
- North Carolina: 54,824
- Louisiana: 51,708
- Ohio: 46,127
- Tennessee: 38,018
- Alabama: 31,097
- Washington: 22,778
- South Carolina: 20,013
- Mississippi: 18,609
- Missouri: 18,148
- Utah: 18,494
- Arkansas: 18,878
- Nevada: 14,060
- Kansas: 12,209
- Oklahoma: 11,028
- Delaware: 10,947
- Oregon: 7,281
- Idaho: 4,412
- West Virginia: 2,590
- Wyoming: 1,254
- Alaska: 905
- Hawaii: 607
- Montana: 743
COVID-19 in NYC

Current Snapshot in NYC:
• 209,313 confirmed cases
  ▪ 54% of total statewide cases
• 22,278 reported deaths*

Daily Positive Cases in New York City

*Due to delays in reporting, recent data are incomplete

Sources: John Hopkins, New York Times, NYC Dept. of Health
Evolution of COVID-19 epidemic in NYC-1

Daily Number of Cases

Source: NYC Department of Health & Mental Hygiene
Evolution of COVID-19 Epidemic in NYC - 2

Daily Number of Deaths

Percent Positive SARS-CoV-2 Tests

Source: NYC Department of Health & Mental Hygiene
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Racial and Ethnic Disparities in the US

• 33% of hospitalized COVID-19 patients are Black/African American, though they constitute only 13% of the U.S. population.

Sources: CDC, Statista
Racial and Ethnic Disparities in NYC

- Data show that **Black and Latino people are twice as likely** to die from COVID-19

Source: NYC DOH (Visual as of May 15, 2020)
Race and Ethnicity and Essential Work

New York City Frontline Workers, by Race and Ethnicity

Sources: NYC Comptroller (US Census), US Water Alliance
Racial and Ethnic Disparities in COVID-19 Testing

Dallas: Testing Sites Concentrated In Wealthier, Whiter Neighborhoods

Sources: NPR, Vox
Racial and Ethnic Disparities: Not a New Issue

Decades of research have shown:

- White medical students and residents often endorse false beliefs about biological differences and rate the black (vs. white) patient’s pain as lower and made less accurate treatment recommendations.\(^1\)

- In emergency departments, non-Hispanic Blacks are half-to-two-thirds less likely to receive opioids for pain than non-Hispanic Whites.\(^2\)

- Studies have consistently shown that Black/African Americans are less likely to get access to advanced treatments e.g. modern chemotherapeutics, transplant surgery, cardiovascular interventions.\(^3,4\)

In the case of COVID-19:

- Black patients that exhibited COVID-19 symptoms were six times less likely to receive testing or treatment.\(^5\)

Hoffman et al., PNAS (1), Singhal et al., PLOS ONE (2), Penner et al., Journal of Social Issues (3), Monlezun et al., Journal of Surgery (4), Rubix Life Sciences (5)
Income Disparities and COVID-19 in NYC

Source: Gothamist/ WNYC
COVID-19 Among Older Adults

United States:
• 8 out of 10 deaths reported in the U.S. have been in adults 65 years old and older

New York City:
• Those 75 years and older have the highest rates of infection, hospitalizations, and deaths in NYC

Sources: CDC, NYC Dept. of Health & Mental Hygiene
COVID-19 in Individuals with Pre-existing Health Conditions

United States:
- 71% of hospitalized COVID-19 patients (n=1037) and 78% of those admitted to intensive care units (n=457) had pre-existing conditions or risk factors.

New York City:
- 88% of hospitalized COVID-19 patients had at least 2 chronic health conditions (n=5,700).

Sources: CDC, JAMA (Richardson et al.), Science Alert
Outline

• Global and local update
• Disparities in impact of COVID-19

**Responding to the COVID-19 epidemic**
• Challenges
• Successes

• Spillover effect of COVID-19
• Summary
Response Interventions

Epidemic Phases

- Introduction or emergence
- Localized transmission
- Amplification
- Reduced transmission

Response Interventions

Anticipation → Early detection → Containment → Control and mitigation → Elimination or eradication
Mitigation and Control Measures

- Limitation on mobility
- Stay at home
- Restrictions on travel
- Closure of Schools
- Limit congregation of people
- Physical/social distancing

- Adherence to public health measures:
  - Face covering
  - Stay home if sick
  - Frequent hand washing or sanitizing
  - Cough and sneeze etiquette
  - Avoid touching face
  - Frequent disinfection of surfaces
  - Isolation of COVID-19 cases
  - Quarantine of contacts
The Goal

Flattening the curve

- Daily number of cases
- Delay outbreak peak
- Reduction in peak of outbreak
- Cases without protective measures
- Health care system capacity
- Cases with protective measures
- Time since first case

Source: US CDC
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**Delayed national response**

### Timeline of COVID-19 Dispersion and Government Responses

<table>
<thead>
<tr>
<th>Country</th>
<th>Days since Wuhan outbreak to 1st case within the country</th>
<th>Days from 1st case within the country to 100th case</th>
<th>Days from 100th case within the country to 200th case</th>
<th>Days from 600th case within the country to 1000+ cases</th>
<th>Restrictions on internal movement</th>
<th>Workplace closing</th>
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<tr>
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<td>10</td>
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<td>Japan</td>
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<td>3</td>
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</table>

**Source:** Brookings
Slow to scale-up testing

Ramping up COVID-19 Testing?
Cumulative number of COVID-19 test administered per 1,000 population since first case detected (selected countries)

- Italy
- Germany
- South Korea
- France
- United States*

Weeks since first case

Tests per million people

A snapshot of early Covid-19 testing per capita

- United States
  - 23,996 tested* as of March 11, 2020
  - Population: 239,882,318
- Japan
  - 8,411 March 4
  - Population: 126,858,191
- UK
  - 23,533 March 1
  - Population: 67,413,271
- Netherlands
  - 6,000 March 7
  - Population: 17,123,760
- Israel
  - 3,451 March 9
  - Population: 8,629,113
- Taiwan
  - 14,695 March 17
  - Population: 23,948,866
- Italy
  - 49,907 March 9
  - Population: 60,846,207
- Guangdong, China
  - 2,890 February 26
  - Population: 113,910,000
- South Korea
  - 189,236 March 9
  - Population: 51,307,400

Some approximations * estimate
Source: Official sources via Our World in Data

* Test counts do not include full reporting from all US labs
Source: Covid Tracking Project, Business Insider, the Atlantic, Taiwan CDC

CC

Vox
Test count discrepancies

COMPARING STATE-REPORTED TEST COUNT DATA WITH THE CDC DATA

There are large discrepancies in the test counts reported by the CDC and state public health agencies.

- CDC reports fewer tests than states
- CDC reports more tests than states

Source: COVID Tracking Project
Stringency of response

Comparison of stringency of COVID-19 response in six countries

PPE shortages

Supply of coronavirus PPE in health care facilities across the U.S., by type of PPE (April 8, 2020) (N=978 healthcare facilities)

<table>
<thead>
<tr>
<th>PPE Type</th>
<th>No Supply Remaining</th>
<th>1 Week or Less</th>
<th>2 Weeks or Less</th>
<th>More than 2 Weeks</th>
</tr>
</thead>
<tbody>
<tr>
<td>N95 Masks (n=670*)</td>
<td>20%</td>
<td>41%</td>
<td>28%</td>
<td>11%</td>
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<tr>
<td>Surgical Masks (n=275)</td>
<td>11%</td>
<td>46%</td>
<td>32%</td>
<td>11%</td>
</tr>
<tr>
<td>Face Shields (n=576)</td>
<td>36%</td>
<td>34%</td>
<td>21%</td>
<td>9%</td>
</tr>
<tr>
<td>Booties (n=304)</td>
<td>36%</td>
<td>37%</td>
<td>21%</td>
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<tr>
<td>Gloves (n=424)</td>
<td>42%</td>
<td>37%</td>
<td>17%</td>
<td></td>
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<tr>
<td>Gowns (n=598)</td>
<td>19%</td>
<td>45%</td>
<td>28%</td>
<td>8%</td>
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<tr>
<td>Hand Sanitizer (n=564)</td>
<td>13%</td>
<td>48%</td>
<td>29%</td>
<td>10%</td>
</tr>
<tr>
<td>Disinfecting Wipes (n=573)</td>
<td>17%</td>
<td>53%</td>
<td>22%</td>
<td>8%</td>
</tr>
<tr>
<td>Thermometers (n=382)</td>
<td>34%</td>
<td>31%</td>
<td>21%</td>
<td>15%</td>
</tr>
</tbody>
</table>

Source: Time Magazine
Inadequate surveillance

Where Covid-19 Deaths Weren't Counted

Analysis of C.D.C. estimates of deaths from March 8 to April 25 shows that many more people died during those six weeks than died in the corresponding period in years past. In many cases, these “excess deaths” are much higher than the death toll from Covid-19 reported on April 25.

New York City reported 16,000 deaths from Covid-19, but our estimates show deaths up to 20,000.

U.S. Deaths Above or Below Normal
94,700 excess deaths from March 15 to May 16

Source: New York Times
Challenges in measuring COVID-19 related deaths

- Current data include largely confirmed COVID-19 deaths i.e. individuals who had positive SARS-CoV-2 test and died
- Some municipalities/countries also collect probable COVID-19 related deaths
- Challenges:
  - Individuals who died early in the epidemic prior to its recognition
  - Limited availability of SARS-CoV-2 tests
  - Individuals who die at home with unclear/undocumented cause of death
  - Individuals who die at health facility without documented test result
  - Individuals with co-morbid conditions with unclear cause of death
- What to do:
  - Probable cases as well as confirmed cases
  - Compare 2020 to 2019 deaths for similar periods of time
Lack of COVID-19 Data on Racial Demographics

Data on COVID-19 deaths often omits race
Each state’s share of COVID-19 deaths for which the patient’s race is unknown, as of May 6, 2020

SHARE OF DEATHS WITH UNKNOWN RACE

Data from The COVID Tracking Project as of 5 p.m. on May 6. For states that reported both race and ethnicity data, race data was used.

Source: COVID Tracking Project
Inconsistent guidance

Trump administration rejects CDC guidance on reopening US amid coronavirus

By Nick Valencia, Betsy Klein, Kevin Liptak and Joe Johns, CNN
Updated 9:22 PM ET, Thu May 7, 2020

CDC and WHO offer conflicting advice on masks. An expert tells us why.

The two organizations have different takes on when to wear one.

Confusion and chaos surround coronavirus testing in the US

By Yasemin Saplakoglu - Staff Writer  March 11, 2020

Sources: Live Science, CNN, ABC News
Continued PPE Shortages

Requests for personal protective equipment by county (N=6169) (May 2, 2020)

Source: Gondi et al, Lancet
Contact Tracing

• COVID-19 characteristics that make it more difficult than other diseases to trace:

  - Can be transmitted before people have symptoms, so in order to prevent onward transmission from exposed contacts, contacts must be identified and quarantined immediately after case identification.

  - No proven effective treatments for COVID-19, making cooperation between public health officials and cases and contacts all the more important.

  - Can cause large outbreaks quickly, so even 1 missed case can significantly undermine control efforts.

Challenges:

- Addressing the workforce gap (skills training, hiring authority and funding, workforce management, etc.)

- Technologies and applications

- National, state, and local coordination

Source: John Hopkins University, A National Plan to Enable Comprehensive COVID-19 Case Finding and Contact Tracing in the US
Adherence to Control Measures

Share of respondents from selected countries saying they wore face mask because of the coronavirus outbreak

- Vietnam: 91%
- China: 83%
- Italy: 81%
- Japan: 77%
- India: 76%
- U.S.: 50%
- France: 34%
- Germany: 20%
- UK: 16%

Survey of 28,000 people 16-74 years-old in 15 countries, April 9-12, 2020
Source: Ipsos
Implications of Re-opening Too Soon

Daily new coronavirus cases in Texas

Daily new coronavirus cases in Arizona

Source: CNBC

State re-opened

State re-opened
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Promotion of Public Health Measures

STOP THE SPREAD OF GERMS
Help prevent the spread of respiratory diseases like COVID-19.

Cover your cough or sneeze with a tissue, then throw the tissue in the trash and wash your hands.

cdc.gov/coronavirus

STOP THE SPREAD OF GERMS
Help prevent the spread of respiratory diseases like COVID-19.

Stay at least 6 feet (about 2 arms’ length) from other people.

6 ft

cdc.gov/coronavirus

Cloth Face Covering Do’s & Don’ts:

**DO:**
- Make sure you can breathe through it
- Wear it whenever going out in public
- Make sure it covers your nose and mouth
- Wash after using

**DON’T:**
- Use on children under age 2
- Use surgical masks or other personal protective equipment (PPE) intended for healthcare workers

Source: US CDC
Hospitalizations before and after stay-at-home orders

Sen et al, JAMA 2020
Testing and diagnostic capacity

Source: COVID Tracking Project
Social distancing measures

New York City

A. Average distance travelled (km)
B. Average radius of gyration (km)
C. Percentage of people staying home

New York City New Cases

Sources: NYC Dept. of Health/ Gothamist, Bakker et al, MIT Connection Science
Scale-Up of Testing in NYC

Daily Testing in NYC

Testing Sites in NYC

Source: New York City Dept. of Health and Mental Hygiene
Milestones reached in NYC

Daily number of people admitted to NYC hospitals for COVID-19-like illness

Source: New York City Dept. of Health & Mental Hygiene

Daily number of people in critical care across NYC Health + Hospitals

Source: New York City Dept. of Health & Mental Hygiene
Record-speed research

CORONAVIRUS RESEARCH
Hundreds of studies about the virus have been published since the outbreak began.

- Journal articles
- Preprints

Cumulative studies

January 2020  February  March

©nature
Data-driven re-opening

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<tr>
<td>Percent of tests positive less than 5%*</td>
<td>1.6%</td>
<td>1.5%</td>
<td>1.4%</td>
<td>1.3%</td>
<td>1.3%</td>
<td>1.2%</td>
<td>1.2%</td>
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<tr>
<td>New cases per 100K population less than 107*</td>
<td>4.94</td>
<td>4.93</td>
<td>4.80</td>
<td>4.67</td>
<td>4.62</td>
<td>4.37</td>
<td>4.37</td>
</tr>
<tr>
<td>New hospitalizations per 100K population under 2?*</td>
<td>0.93</td>
<td>0.89</td>
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<td>0.88</td>
<td>0.84</td>
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<td>Hospital beds available greater than 30%*</td>
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<td>29%</td>
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<td>Fewer than 375 critical cases at public hospitals?</td>
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<td>320</td>
<td>315</td>
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<td>Percent of tests positive less than 15%?</td>
<td>3%</td>
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<td>2%</td>
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</tbody>
</table>

Notes: the city and state appear to be using different methods to calculate percent of tests positive. * = 7-day average.

Source: New York State Dept. of Health/ Gothamist
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Spillover effect of COVID-19 on global health

- **Tuberculosis**: 1.4 million additional TB deaths by 2025
- **Malaria**: 382,000 additional malaria deaths in 2020
- **Routine Immunisation**: 80 million children at risk of vaccine-preventable diseases
- **Reproductive Health**: Up to 15 million unintended pregnancies
- **HIV**: 673,000 additional HIV-related deaths in Africa in 2020
- **Maternal & Child Health**: 2.3 million child deaths and 113,000 maternal deaths over 12 months
- **Non-Communicable Diseases**: Cancer treatment disrupted in 42% of countries
- **Poverty**: Deepest global recession since World War II

Graphic credit: Jacob Bigio
Disruption of Health Service Delivery

Global Fund, 2020
Lessons learned from HIV

- Leadership and political will
- Myths and misconceptions
- Tackling stigma
- Engagement of affected communities
- Adherence to proven interventions
- Investment in health systems
- Data to inform action
Summary

• The COVID-19 pandemic continues to expand and evolve
• Specific populations are disproportionately affected, both in terms of burden of disease and burden of complications
• Response to any outbreak/epidemic requires an ordered approach with frequent communication by trusted spokespersons
• Challenges and successes have been experienced in responding to the pandemic
• Investment is necessary in both public health as well as in health system in order to effectively respond to an epidemic
• Many lessons learned from the HIV response that can guide us moving forward as we face COVID-19